James Acker:
I'll get my presentation now.

One thing I've learned so far from this meeting is that presenters should have a chance to play with the WebEx tools.

So I'll try out a couple of them.

Tracy Van Holt:
woo hoo!

James Acker:
We now have a 10-year climatology of MODIS-Aqua data in Giovanni, at 4 km resolution

Which is good for large lakes.

Like the Great Lakes. Previous atmospheric correction algorithms and spatial resolution of the data have made it harder to study the large lakes.

Euphotic depth is a very robust product - not as many assumptions needed compared to chlorophyll - and we now have 10 years of euphotic depth data. This is Zhongping Lee's algorithm.

Ever since SeaWiFS, and even before, the manifestation of a spring turbidity feature in southern Lake Michigan has been observed.

It was consistent enough to even spawn an experiment with an acronym.!

It is caused by seasonal wind stress, similar to what Eurico described, causing both a coastal current regime and wave action. The coastal current regime is actually somewhat

similar to the coastal currents in the northern Red Sea (subject of a Giovanni-using paper)

You can see the plume here in a SeaWiFS image and an AVHRR reflectance image.

Because this is a wind-induced feature. It can appear at any time -- even in the snowy depths of winter.

Still, it was and is primarily thought to be a springtime feature. These images show the progression of springtime turbidity in 1998.

Utilizing our newly available MODIS-Aqua ocean climatologies, I created anomaly image for March through June from 2003-2012. We also have things like normalized fluorescence line height and particulate organic carbon.

Negative anomalies indicate increased turbidity (lower euphotic depth). Positive indicates less turbidity (higher euphotic depth). Reverse rainbow palette has low for blue and purple, high for red and orange.

In 2003, the classic spring pattern was observed.

In 2004 the southern turbidity was observed - I believe the larger negative euphotic depth in June is probably a bloom.

2005 was a less-turbid spring for the lake.

IN 2006, the pattern is present, but less intense.

2007 was a "clear" year. It would be interesting to look at data like wind stress to see if there is correlation.

2008 was very interesting. The southern end of the Lake was pretty clear. But June

2008 has an entirely different pattern.

This coastal turbidity was due to runoff from heavy rains (my abstract has a link to a paper abstract describing this). As I note on the slide, the floods were heavy in Des Moines, Iowa.

2009 may indicate an "early" spring, possibly indicative of a slow climate shift in the Great Lakes region.

Note here that the "reverse" pattern is indicative of the dominance of the pattern of turbidity that occurred earlier in the period (i.e., 2003 and 2004).

2011 looked more like the spring pattern that was evident in the late 1990s and early 2000s.

And finally earlier this year, turbidity in southern Lake Michigan was observed in May.

To use Giovanni one more time, I created a small time-series area in the southern end of the lake, named after the nearby state park.

This area extends from the coast into the lake, and should be indicative of turbidity "intensity".

Here is the time-series of euphotic depth anomaly for the study area. April is a red dot to help identify the season. There is an overall trend in lessening spring turbidity.

So the question for future research is: are climatic influences causing this apparent shift?

I'll let you read my summary statements

(And is it proper to call it "ocean optics" in freshwater lakes?)

Eurico D'Sa:
what about lake optics?

James Acker:
I want to acknowledge the project led by Zhongping Lee, which will provide some exciting data products at high resolution this year.

"Lake optics" is acceptable.

And I also want to acknowledge the GES DISC management, which supported the workshop and my research with Giovanni.

Time for a couple of questions.

or just applause ;)

Tracy Van Holt:
yeeeeyyyy!

Eurico D'Sa:
Any plans to use wind data in this study?

James Acker:
Since I've seen what MERRA data has, I may try wind stress data from that to start.

It's easy in Giovanni.

Tracy Van Holt:
I am intrigued by the wind data too.

James Acker:
We know that there have been changes in ice cover in Lake Superior -
may also affect northern Lake Michigan.

OK, I'll now make Tracy van Holt of East Carolina University the presenter.

Tracy Van Holt:
It is this type of climate chagne data that is needed for social-science studies and environmental change studies. We really need to assess where change is occuring.

Eurico D'Sa:
Jim, Unfortunately QuikSCAT sensor has stopped working. What are the other wind data sources?

James Acker:
Mostly MERRA and reanalysis. I believe there is also a European scatterometer?

Muna Alkaabi:
did you tried to use the kd to indicte the turbidity ?

James Acker:
It should show a similar pattern, I think.

Email me with any more questions! Tracy, it's your turn.